

# PATENT SPECIFICATION

DRAWINGS ATTACHED

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## Improvements in and relating to apparatus for making vertical holes in the ground.

### COMPLETE SPECIFICATION

We, N.V. TOT AANNEMING VAN WERKEN, VOOR-HEEN H. J. NEDERHORST, a body corporate organized and existing under the laws of The Netherlands, of 8, Turfmarkt, 5 GOUDA, The Netherlands, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to apparatus for making vertical holes in the ground and comprising a hollow tubular body having a cutting edge at its lower end and provided 15 with means for moving the body up and down in the hole.

Apparatus of this kind, according to the present invention, comprises a tubular body having an annular knife edge at its lower end and provided with means for reciprocating the body along its vertical axis without rotating the body about its vertical axis, said body being provided with a nozzle at its lower end inside the annular knife edge and 20 and at its upper end being provided with a connection for introducing water into the body. Preferably the annular knife edge extends to a somewhat lower level than the nozzle at the lower end of the tubular body. 25 With this apparatus, the earth loosened by the cutting edge in the lower end of the hole is dissolved by the water spray and discharged upwards in the hole towards the surface of the ground. Owing to this manner of removing the earth loosened by the cutting edge, this apparatus can make vertical holes very rapidly. 30

The invention will be further described with reference to the accompanying drawing illustrating an embodiment of the apparatus according to the invention. 40

In the drawing fig. 1 is an elevation of the apparatus, partly in section, and

Fig. 2 is a cross-sectional view taken on 45 line II—II of fig. 1.

The tubular body 1 encloses a tube 2 and is secured at its upper end and its lower end on said tube by welding. An annular knife edge 3 is connected to an annulus 5 by means of ribs 4, the annulus 5 being threaded 50 on its inner periphery and being screwed on to a similar screw thread provided on the outer surface of the lower end of the tube 2.

A nozzle 6 provided with lateral outlet holes 7 is also secured to the lower end of 55 tube 2.

The tube 2, at its upper end, has a connection 8 to which, in operation, is connected to a flexible water delivery pipe which is paid out from the surface as the apparatus 60 descends into the ground.

In order to reduce the resistance to said movement of the apparatus, the ribs 4 are provided with sharp edges 9.

A strap 10 is secured to the upper end of 65 the tubular body 1 and by means of said strap, the body is suspended from a rope or cable of a hoisting apparatus so that the body may be reciprocated in the hole without rotating about its vertical axis. 70

It is to be noted that the cutting edge 3 and the nozzle 6 may easily be replaced.

### WHAT WE CLAIM IS:—

1. An apparatus for making vertical holes in the ground and comprising a 75 tubular body having an annular knife edge at its lower end and provided with means for reciprocating the body along its vertical axis without rotating the body about its vertical axis, said body being provided with a nozzle 80 at its lower end inside the annular knife edge and at its upper end being provided with a connection for introducing water into the body.

2. Apparatus as claimed in claim 1, in 85 which the annular knife edge extends to a

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lower level than the nozzle at the lower end of the tubular body.

3. Apparatus for making vertical holes in the ground, constructed and adapted to  
5 operate substantially as described with reference to the accompanying drawing.

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For the Applicants.

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*This drawing is a reproduction of  
the Original on a reduced scale.*

FIG.1

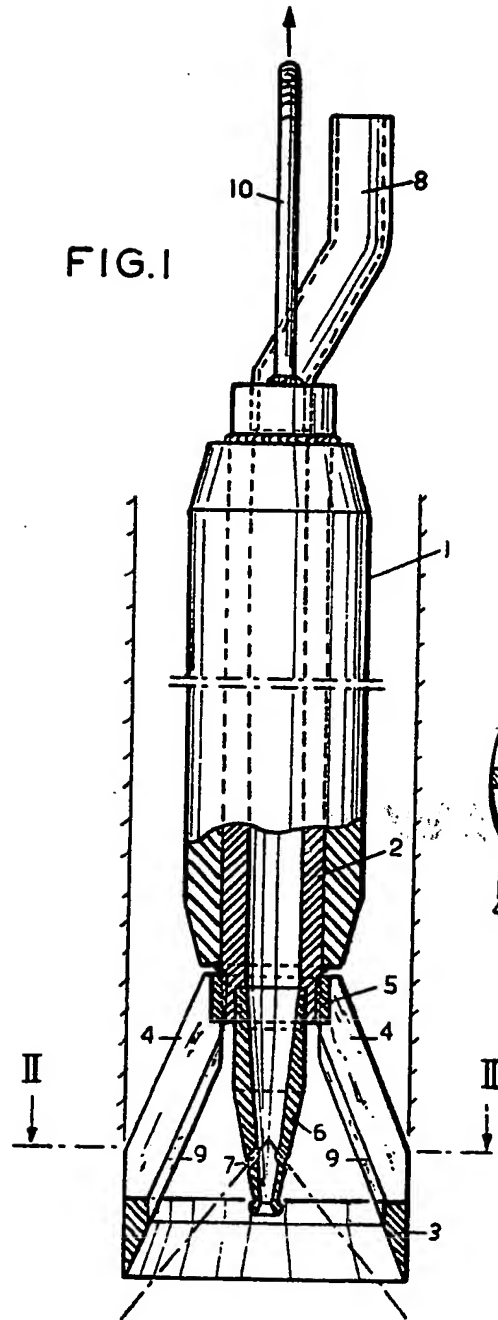
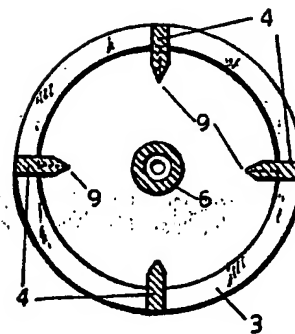


FIG.2



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